The Excavating Engineer

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Railway Construction in the Belgian Congo

Relocating Matadi-Leopoldville Railway Under Difficult Conditions—Six ¾-Yd. Revolving Shovels Used

By R. G. BURDETT

SOME 98 miles up the Congo, that mighty river of Equatorial Africa, and surrounded by mountains of rock, lies the port of **Matadi.** On account of the rapids, almost at the foot of which Matadi is situated, this is the last accessible point on the river for ocean shipping.

Navigation is again possible at Leopoldville, above the falls, from whence access is given to that vast colony, the Belgian Congo, by a system of river steamers travelling over the River Congo and its great tributaries.

Chemin de Fer du Congo, The Matadi-Leopoldville Railway line, was built to connect these two towns, and constructed some 25 years ago under excessively difficult conditions and with great loss of life. It has been operated under conditions, which, with the growth of this country, have proved to be uneconomical.

This railway line, 400 kilometers in length, is the gateway to the Colony, and over its single line must pass all the requirements of the 900,000 square miles of territory and 10,000 miles of navigable rivers comprising the Belgian Congo.

Food supplies, railway material, heavy machinery, sections of river steamers for the Upper Congo, and palm oil, kernels, rubber, gum, ivory, etc., for export, all must pass over this narrow-gauge railway which traverses a tract of country that is practically a continuous succession of great hills and valleys throughout its length.

The railway turns and twists around these hills in a most amazing way, with scarcely half a kilometer of straight line from beginning to end.

Inclines of 35 millimeters per meter (3.5%) and curves of 50-meters (164 feet) radius are included; the section of the rail limits the weight of the ordinary locomotives to 28 tons and the Garrett locomotives, which have the weight distributed over two trucks, to 56 tons; and it is only possible to run very light trains, the usual train consisting of locomotive and 3 wagons, and these not infrequently have to make several attempts to climb the grades.

"Express" passenger trains leaving Matadi early in the morning can only reach Thysville (231 kilometers or 144 miles) at night, and travellers have to resume their journey the following morning, two days being occupied in covering the 400 kilometers or 250 miles from Matadi to Leopoldville.

Being a single track line, very serious delays occur, especially in the event of a breakdown, and it is not surprising to find that the line is no longer adequate to the requirements of the Colony.

Just after digging the first dipper full. M. Vindevoghel is seated on the boom, the operator is next to him.

Plans for Line Improvement

In view of the ever-increasing traffic, made necessary by the development of the Belgian Congo, it has been decided to transform the railway line in such a manner as to give it the following characteristics: Inclines of 17 millimeters per meter (1.7%), radius of curves 250 meters (820 feet), and gauge of 1.06 meters (41¾ inches).

The execution of this work is being carried out by the Societe Africaine de Construction, of Brussels, M. Girard being works manager, and M. Vindevoghel, engineer.

The project calls for a very considerable amount of earthwork in the construction of the 300 kilometers or 187 miles of line which are in course of reconstruction, 6,000,000 cubic meters (almost 8,000,000 cubic yards) of earth having to be exca-

vated, and the necessary embankments formed.

The very short time allowed The Societe Africaine de Construction (S'Africas) to complete the work, and the difficulty of obtaining native labor, led to the consideration of the employment of mechanical excavators, with the result that six 20-B Bucyrus steam shovels were purchased and have been erected at different points of the line, and these shovels have now commenced to excavate the many different kinds of soil encountered, notably extremely hard and compact clay with rock in course of formation.

The six revolving shovels are all mounted on caterpillars, and equipped with wood-burning boilers and standard ¾-yard dippers.

Owing to the difficult country, most of the shovels had to be erected at some distance from the working position, and travel under their own power to the scene of operations. Water courses, embankments, narrow deep cuttings, with acute bends and heavy grades, jungle and scrub were all encountered and surmounted without any difficulty by the small caterpillar-mounted shovels.

For the purpose of hauling the excavated material from the shovels, each 20-B is attended by two locomotives and 30 1-cubic-meter wagons (holding about one and one-third cubic yards), with a European supervising and in charge of the outfit. Natives are employed as drivers and firemen on the locomotives, and also as operators and firemen on the steam shovels.

Considering that these "boys" have never before seen a mechanical shovel, the efficiency of the native operator, in such a short time, is remarkable. The firemen had no difficulty in keeping steam with wood fuel, cut in surrounding jungle.

The shovels are somewhat handicapped by reason of the narrowness of the cuttings, the width of the base of which is only 7.55 meters or about 25 feet, and have in the compact clay in which they are working almost vertical sides. The contour of the district makes it impossible in most cases to get the line and wagons on the bank of the cutting which would enable the shovel to load the wagons on the side. Loading behind the shovel has therefore been adopted, and two wagons only can be pushed up at one time for loading, after which they are hauled out by a locomotive until the train is made up.

Good progress, however, is being made, and on the completion of the new line, with the cutting down of the heavy grades and curves, and the consequent shortening of distances, it is expected to complete the journey from Matadi to Leopoldville in one day, instead of two as at present. This, together with the heavier loads, which will then be capable of transportation, will add materially to the prosperity of the Belgian Congo.

Two of the six Bucyrus 20-B steam shovels at work in the Belgian Congo. Note the machine in the cut in the central background.

Driving a Tunnel in Record Time

The boring of the Shandaken Tunnel under the Catskill Mountains as a part of the system to increase New York City's water supply resulted, it has now been determined, in some of the speediest tunnel driving with modern explosives of which there is any record. In one calendar month, operating on a two-shift basis, according to figures of the New York City Board of Water Supply, 620 feet were excavated on the south heading of Shaft No. 1 towards the intake end near Prattsville. This is believed to constitute a world's record for two-shift work. During another calendar month 596 feet were excavated with the aid of dynamite near Allaben on the south end of Shaft No. 7. The greatest advance with one round of shots was 14 feet 5 inches. In one year the builders, through the use of powerful explosives, were able to put through nearly nine miles of tunnel excavation. The rock encountered varied from shale through sandstone to true quartzite, the last of which makes especially hard drilling.

There were 584,000 cubic yards of rock excavated, and the total length of holes drilled was 3,000,000 feet, or 570 miles. The dynamite used amounted to 2,500,000 pounds.

The tunnel is 18.2 miles in length and the longest in the world. It connects the Schoharie Reservoir with the Ashoken Reservoir, and as a part of the new system which has just been put in use will make certain an adequate water supply for New York City. The explosive used was a powerful gelatin dynamite, which, plus modern engineering practice, made this work possible.

Dragline Operation on Florida Highways

Description of W. P. McDonald Construction Company's Operations Near Lakeland, Florida, with a Review of That Company's Road-Building Activities Since 1911

IT is not the easiest job in the world to handle road work in Florida for nine years with a clean record of performance. But this is what the W. P. McDonald Construction Company of Flushing, New York, have done.

This firm stands out as one of the East's most progressive and successful road-builders. Mr. McDonald started in the contracting business in August, 1911. To his credit stands such projects as Pelham Bay Parkway, the reconstruction of Merrick Road in Queens County, New York, Richmond Manor Road through the Borough of Richmond, the Pelham Naval Base, Lincoln Highway between Red Bank, Long Beach and Deal Beach, New Jersey, and many more projects of equal importance.

Fifteen years ago he handled a fifteen-million-dollar contract for state road in Pennsylvania. For the past three years all of the outstanding contracts for paving and road-building in the city of Schenectady, New York, have been handled by his company. During 1924, twenty different jobs were under way at the same time, and the season closed with close on to $400,000 of work completed in this city alone. During the past year about 125 miles of road were under construction by the McDonald organization. He keeps busy thirteen shovels and dragline excavators and operates asphalt plants at Oneonta, Poughkeepsie and Schenectady, New York. This brief outline of the accomplishments of this well-known firm will serve as a setting for the remarkable success that they have achieved in Florida.

In this state alone McDonald has carried on work in excess of a half million per month, and so successfully has he handled it that the question has never arisen as to whether his contracts will be completed on time, or as to whether he will meet fully the requirements of the state and county commissions.

His activities in Florida began in 1916, when he was awarded a million-dollar contract in Polk County. This work was completed on time and at a fair profit, while four similar contracts which had been let to other contractors at the same time had to be completed by the bonding companies. In 1922 he built 9 miles of state highway (Federal Aid Project) in Orange County, and handled a smaller contract amounting to about $102,000 in the same county. While these jobs were under way in 1923, he started 60 miles of asphalt sheet and asphalt concrete on a limestone base, which he cleaned up on April 1st of last year, an average of a mile a week. This work stands close to a record for performance. In 1923 additional work was procured and completed in Orange County. In December of that year a contract for 10 miles of asphalt concrete pavement on Barstow clay base was awarded to him in Polk County, and is now scratched off the books as completed.

In March of 1924, Hardee County awarded him 94 miles of road to be built on a Florida limestone base with surface treatment. This contract was started in May 1924 and has recently been completed.

In addition to the above, numerous other contracts have been handled. For example, a $350,000 Federal Aid Project in Alachua County, handled between February and August 1924, and 11 miles in Marion County, consisting of sheet asphalt on a 3-inch limestone foundation, which we understand is still under construction.

Istachatta Quarry

In order to enable his concern to handle the contracts requiring limestone base with greater efficiency and speed, Mr. McDonald has equipped and has begun work in a quarry at Istachatta, Florida. In this quarry he expects to produce 500,000 tons of limestone of 99% carbon of lime

20-B Diesel Dragline in Operation. This Machine Burns Fuel Oil at a Cost of About 6¾c a Gallon.

within two years, or an average of about 750 tons per day. This quarry covers 37 acres with 10 feet of stripping. It is equipped with a primary crusher 24 inches x 48 inches, and a secondary crusher 22 inches x 36 inches, both driven by a 75 h. p. Fairbanks-Morse semi-Diesel engine. Screening equipment is provided for 3½-inch, 2-inch and 1½-inch sizes. A 30-B Bucyrus Diesel dragline has been purchased for this quarry.

Polk County Work

This company is now engaged on a 230,000-cubic-yard highway job for the Polk County Commissioners, which is interesting, in that the excavation is being handled by a ¾-yard Diesel dragline. Dredge excavation was obtained at 60c per yard and muck excavation at 50c. The contract involves the building of several miles of new roads from one to eight miles in length, all of which were built with fills. The contract involves building these fills, laying the rock base and the surface treatment, together with the construction of bridges and concrete culverts. The road is being carried through swampy lava that is overlaid with quite a layer of muck between the sands. The right-of-way is 50 feet wide. The fill is being built 25 feet in width, and the roadbed itself 15 feet. Drainage ditches are being constructed on either side of the road 4 feet deep and 10 feet wide. The fill is placed on a limestone base. The dragline excavator, which is a Bucyrus 20-B equipped with a 40-foot boom and a ½-cubic-yard bucket, is working over sand and clay and muck, operating on mats. This machine is operating 10-hour shifts and is making an average of 600 cubic yards per shift. It is at present excavating the drainage ditches and making the fills for the roadbed.

The fuel used is a 32 gravity fuel oil costing about 6½c per gallon. Approximately 18 to 20 gallons are being consumed in the 10 hours, the engine actually running and the machine digging about 9 hours of the time. The fuel oil is brought to the camp and carried to the dragline in metal drums by teams. The McDonald Company are using the Diesel operated machine on account of the rock fill and water conditions which have necessitated rather high operating costs for the steam machines.

As stated, the limestone for the base is obtained from the Istachatta Quarry, a Bucyrus 30-B Diesel dragline being used for stripping the overburden.

This company is also operating Erie and P. & H. shovels for digging and unloading clay; an Erie shovel for furnishing materials to the elevator chain at the asphalt plant; a 20-B Bucyrus shovel, Best tractor, Austin graders, Cummer asphalt plant distributors and Austin and Kelly-Springfield rollers. This contract was awarded on September 19, 1924.

John E. Ballinger is general superintendent of the work with John Gross, general foreman. Wm. Foxworth is the operator on the Bucyrus Diesel dragline. The county engineering force is represented by J. J. Stringfellow.

W. P. McDonald's 20-B Diesel Dragline Excavating for a Road Near Lakeland, Florida

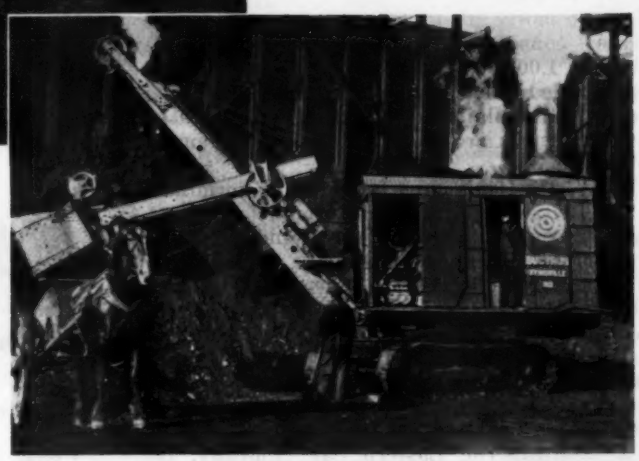
Loading Coal Delivery Wagons at a Canadian Operator's Yards

Small Revolving Shovel Solves Problem of Loading Conveyances of Widely Varying Capacity Economically—Description of British Steel Corporation's Operations at Windmill Point Yards, Montreal

ALTHOUGH the Dominion of Canada depends almost entirely upon the United States for its supply of anthracite, there are extensive bituminous coal fields in British Columbia, Alberta and Nova Scotia. In this last-named province, The British Empire Steel Corporation operates, through two subsidiaries, The Dominion Coal Company, Limited, having fifteen mines near Glace Bay, Cape Breton, producing an annual output of over 3,000,000 tons and employing over 6000 persons, and The Nova Scotia Steel and Coal Company, Limited, operating four mines near Sydney Mines, also in Cape Breton, having an output of over 650,000 tons and employing over 1,300 persons.

Although this coal from Cape Breton is shipped to all parts of the Dominion, a substantial portion of it is distributed in Montreal. The bulk of this coal is delivered to the docks at Montreal by steamers, from which it is unloaded at the British Steel Corporation's Windmill Point Yards and stored in large stock piles. From these stock piles the coal is distributed to the coal dealers of the city for delivery to their customers. During the season of 1924 the British Empire Steel Corporation handled over 650,000 tons at this point.

Small Revolving Shovel Used for Coal Loading by the British Empire Steel Corporation at Their Windmill Point Yards, Montreal.



Bucyrus 20-B loading a one-horse dump cart which holds about a ton. The dipper drops the load squarely into the cart without spilling at the sides.

Method of Distribution

The coal dealers supply their own means of transporting the coal, and send their vehicles, may be one-horse carts, two-horse dump wagons or motor trucks of 1 to 5 tons capacity, to the yards to be loaded. From the yards the dealer's conveyances deliver the coal to the consumer.

Formerly, a large number of these wagons were loaded by hand, which proved unsatisfactory to both the coal operator and the dealer, because of the large amount of time required; the balance of these conveyances were loaded by the clamshell on the coaling bridge, a method practiced by some other operators of the city; this proved unsatisfactory because the spread of the clamshell was too large for the smaller carts. To expedite the distribution of this coal the British Empire Steel Corporation installed a Bucyrus 20-B steam shovel, equipped with a special 1½-yard coal-loading dipper without teeth. This machine has been found to load all types of wagons rapidly, and in the case of the smaller carts is particularly useful as the dipper drops a full load very nicely into the little cart.

Operation

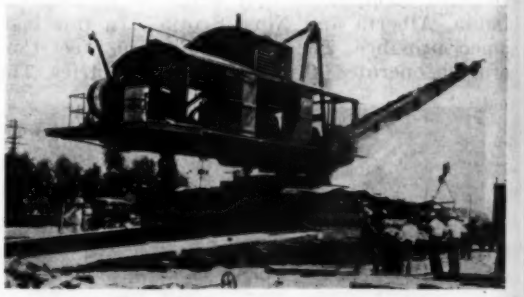
The machine is only used about 50% of the time, for the load of each conveyance may be going to a different part of the city, and the stream of wagons and trucks to the shovel is far from steady. In the early morning, at the start of the day's work, as many as twenty-five vehicles may be seen waiting for their first load; after the first load, however, they never return in such force, because of their different destinations and speeds. This leaves the machine idle for a large part of the time, but even under the present conditions it moves about 500 tons per day. The operators consider that they have capacity in the shovel for 1,000 tons per day. The operators are very satisfied because of the increased loading capacity of the plant, and the dealers are pleased since the trucks are loaded with a minimum of lost time.

W. W. Morley is superintendent of terminals for The British Empire Steel Corporation; W. C. Haynes is superintendent of the Windmill Point Docks. John Cleary is pulling the levers of the 20-B and Napoleon Mallette is keeping up steam.

Some conception of the size of The British Steel Corporation in Canada may be had from consideration of the fact, that in addition to the Dominion Coal Company, Limited, and the Nova Scotia Iron and Steel Company, they also have as subsidiaries, the Dominion Iron and Steel Company, Limited, The Eastern Car Company, the Halifax Shipyards and one or two other concerns. The Dominion Iron and Steel Company operate both slope and open-cut mines near Wabana, Newfoundland, where they employ over 3000 men, and produce over 6600 tons daily. Their equipment includes four railroad-type shovels, eighty air drills, supplied by compressors capable of delivering 2,200 cubic feet of air per minute at 80 pounds pressure (Walker, Ingersoll-Rand, Sullivan and Nordberg), two electric locomotives and seven 7½ Gates crushers.

Solving a Dragline Transportation Problem on the Imperial Irrigation District

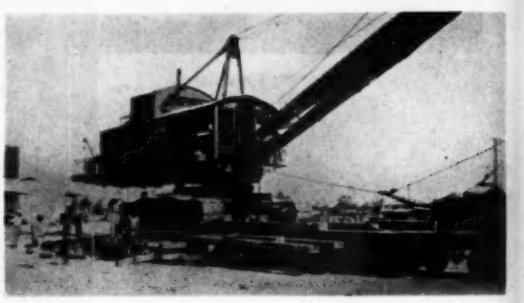
Ray S. Carberry, Chief Engineer of the Imperial Irrigation District, Calexico, California, was recently presented with the problem of transporting two Bucyrus Class-9½ gasoline-driven, caterpillar-mounted draglines from one side of the Imperial Valley to the other. Imperial Valley, incidentally, is located in Imperial County in Southern California close to the Mexican border.



The Dragline on the Cribbing Over the Flat Car, Ready to Be Lowered — Note Runways

This problem would not have been of a serious nature were it not for the fact that to complete this move two rivers, the New and Alamo, had to be crossed, over neither of which was a highway bridge sufficiently strong to carry the load.

This type of dragline excavator normally carries a boom 45 feet long and weighs 62½ tons.

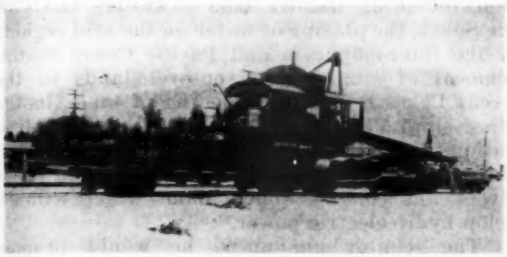


Lowering the Dragline on the Flat Car

Under ordinary circumstances this means dismantling the machine or building bridges, both expensive propositions, to say nothing of the loss of time involved.

However, another method presented itself in this instance. A branch line of the Southern Pacific takes a swing southward across Imperial County, through El Centro, across the Mexican border, and loops north again hitting the main line near Yuma, Arizona, crossing the Irrigation District at points close to where the machines had to work.

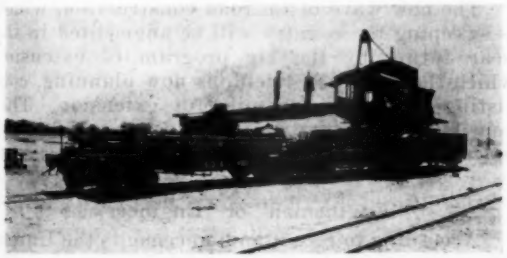
As may be seen from our views, these machines are mounted on caterpillars. The width of these caterpillars outside dimensions is 17 feet, considerably greater than ordinary railway clearances. The distance between the inside of each caterpillar is 11 feet, somewhat wider than the ordinary flat car. It was decided, therefore, to set the machines on the cars lengthwise, with the two caterpillars straddling the car.



From Rear, Showing Manner of Supporting the Revolving Frame

Runways were cribbed on each side of a flat car, just far enough apart, and just high enough, so that the machine would clear the car as it climbed the ways under its own power. The runways were then lowered until the weight of the dragline rested securely on the car and, of course, the cribbing removed entirely. The machine was set in such a position that the center of base was about four feet from one end of car.

The boom was then lowered until it just touched the blocking on the car ahead, so that little, if any, weight was supported by the car,



Ready for Shipment, Showing Method of Supporting the Boom

thus allowing the boom to slide freely in going around curves.

A gondola was run in at the back end of the machine. The cab of the machine overhung this car, and was jacked up and supported on its top. Three cars in all were used for each dragline.

This method of moving the machines was found very convenient in this instance and saved much time and labor. The cars were moved at a speed of four miles per hour. Care had to be exercised, however, in going in and out of switches and around curves. On account of clearances it would ordinarily have been impossible to make shipment of a machine of this size on a main line, but through the co-operation of railway officials, the removal of switch stands and cattle guard fences, the trip was successfully made over this branch line. One dragline was moved three miles in this manner and the other five.

Basement Excavation for New Children's Hospital of Pittsburgh

R. M. Netherland Company of 206 Pennsylvania Avenue, Pittsburgh, Pennsylvania, began work on the new Pittsburgh Children's Hospital on March 12th of this year. The total cost of the new building with its equipment will be in the

R. M. Netherland's 20-B Loading a 5-Ton Mack Truck from Basement Excavation

neighborhood of $2,000,000. York & Sawyer and E. P. Mellin are the associate architects, while W. T. Grange Construction Co. are the general contractors on the job.

The R. M. Netherland Co. dug the foundation for this building with a Bucyrus 20-B steam shovel. The excavation amounted to 20,000 cubic yards and the depth made two cuts necessary. All the material was loaded into trucks on the bank from whence it was hauled a mile and a half to the dump. Twelve 5-ton Sterling and Mack trucks served the shovel. The material was clay and it required from seven to nine dippers to fill each truck. We are advised by Mr. Netherland that the machine loaded 276 5-yard trucks in ten hours.

Tyson Hendricks, Operator

Operator Tyson Hendricks is pulling the levers and Albert Hendricks is supplying the steam.

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The Trend to the Revolving Shovel

For the past fifteen years the full-revolving type of shovel has been steadily but irresistibly pushing its front lines further and further into the hitherto impregnable stronghold of the old faithful shovel of the railroad type.

Fifteen years ago the clay pit, the gravel plant, the iron and copper mine, the quarry and the railroad job were quite securely in the possession of that sturdy old truck-mounted mill.

With the steady improvement of the "whirly" and the development of the mammoth stripper and the flexible dragline excavator, its outposts fell one by one. The gravel plant went, the clay pit followed, the 300-ton stripper made great inroads into the world's greatest open-cut operations.

The railroad job is now tottering. Every new big contract finds a larger proportion of revolving shovels up against work on which, a decade ago, a contractor would have been discredited had he introduced other than the well-tried equipment. In the past few years the great mobility and flexibility of the revolving shovel has led to its use in growing numbers even in quarry service, despite the greater strength and power of the railroad-type machine.

Now comes the announcement of the new type of 4-yard revolving shovel with the close-coupled strength and ruggedness of the older type combined with a power that is at last commensurate.

We have not yet seen the day when the railroad-type shovel can be totally relegated to the shelf, if we ever do. But we look upon this new machine as marking a new and a greater step forward in the development of heavy excavating machinery. It will without question of doubt open up a new field for the full-revolving machine where heavy ores and rock are encountered.

A Vast Reclamation Program

At the next session of Congress, there will be presented a program of reclamation work which will gladden the hearts of contractors, should it come through the mill in a form approaching that which is now contemplated.

Senator McNary of Oregon, Chairman of the Irrigation and Reclamation Committee, is author of this plan. It embraces all forms of reclamation, including the drainage of swamp lands in the South, the placing of water on the arid regions of the inter-mountain and Pacific Coast States, removal of stumps from cutover lands in the Great Lakes region, the flooding of lands in the Mississippi Valley States to provide subsoil irrigation, restoration of soil in the New England States, flood control on the Colorado and other rivers, and construction of dams which will develop hydro-electric power.

The senator announced he would propose establishment by Congress of a revolving fund of from $350,000,000 to $500,000,000 to capitalize reclamation projects approved by the Secretary of the Interior and incorporated under the laws of the state or states in which they might be situated.

The plan would contemplate the issuance of bonds by the incorporated reclamation districts or projects, which in the opinion of Senator McNary would find a ready market. Proceeds from the sale of the bonds would be used to repay advances made by the Government out of the revolving fund.

The new wave of railroad construction, which is sweeping the country will be augmented in the near future by the big program of extension which the Canadian Pacific is now planning, consisting of twenty-five miles of extension. This consists of six distinct jobs, all of which offer splendid prospects for the railroad contractor.

"Engineman" or "Engineer"

According to recent announcements the United States Civil Service Commission has adopted the use of the term "engineman" in lieu of "engineer" in advertising examinations for positions, the duties of which are the operation, maintenance, and repair of stationary or moving engines, the performance of which does not require a professional education.

In reaching a decision as to the adoption of this usage the Commission wrote to classification experts, engineering societies, and individual personnel men. The opinion was unanimous that the term "engineman" was one suitable and less susceptible to confusion than any other term which might be used.

· FIELD NOTES ·

A Test for Your Drivers

By Philip L. Sniffin

Very often a man hired as a driver does not make a success of himself because he is lacking in a knowledge of the motor truck's mechanics. Very often he knows the traffic rules; the speed regulations; how to steer the truck moderately well and how to shift gears, yet he is unable to explain to anyone just why the wheels go round. In a general way he knows the truck has an engine, clutch, gear-set, rear axle, steering wheel, and a body to carry material. But just what happens in the engine on the four strokes of the cycle he cannot comprehend, because no attempt was made to school him in the fundamentals when he first became a driver.

Here are eight interesting questions used as a test by one concern for drivers before they enter the company's employ. The questions, although simple in form and comparatively easy to answer when once explained, are a great value in training the driver's mind to think of the various parts of the truck's mechanism, and how his neglect to give these parts the care to which they are entitled will result in a high operating cost. Incidentally, the excavating engineer might well use these questions as a test to his drivers to determine how well they know the principles of motor truck operation.

1. What is the purpose of a radiator and water? How does the water do its work? Why is it necessary to keep the radiator full?

2. What different kinds of oil are necessary to good lubrication of a truck? Why does the cylinder require a different kind than the differential?

3. What change takes place in the cylinder when you advance the spark lever? Should you advance or retard the spark when the engine is working up to its limits, and why?

4. How many times does the piston go up and down in the cylinder every time an explosion takes place? What is the action of the gasoline gas in the cylinder from the time one explosion takes place until the next one occurs? Why are the carburetor and intake manifold water-jacketed, and what advantage is gained by such construction?

5. What happens to the cylinder when the motor is run without water? Oil?

6. What happens when you are coasting down hill and suddenly let in the clutch?

7. Why is it not good to put on the brakes suddenly? If you do, what happens to the brake shoes?

8. What does running in car tracks do to the tires?

The questions are, of course, very elementary, but when answered satisfactorily indicate that the driver understands the principles of the internal combustion engine, and the why and wherefore of engine lubrication and cooling.

In other words, they enable him to picture to himself the reason why the wheels go round. The answers to these questions indicate that the driver can make a mental picture of just what happens in the mechanism of the car as he goes through the various routine motions of an average day's work. While sitting on his seat driving the car, his mind can look through the walls of the engine and imagine the pistons moving up and down and just what occurs during each of the four strokes of the engine. He can see the pistons reciprocating, and the connecting rods moving up and down, and see the crank-shaft with the flywheel at the rear end revolving. When he understands these simple motions he knows how the reciprocating motions of the pistons is transformed into the revolving motion of the crankshaft through the medium of the crank arm and the connecting rod. Tracing the power of the engine farther aft through the clutch, then the gear-set, and finally to the rear axle, he has a very good mental picture of just what makes the car run.

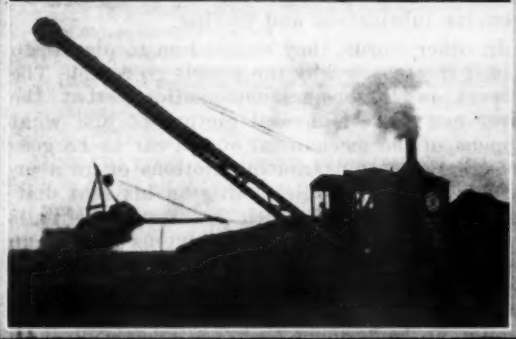
They also bring home to the driver the necessity of proper lubrication and proper engine cooling. Without sufficient water the engine overheats, thereby tending to neutralize the effect of the lubricating oil, and results in bearing wear and high gasoline and oil consumption per mile run. The proper answers to the questions regarding the advancement or retarding of the spark lever when the engine is working up to its limit insures that the driver will get the most out of his engine and probably reduce the gasoline consumption considerably.

Boiler Don'ts

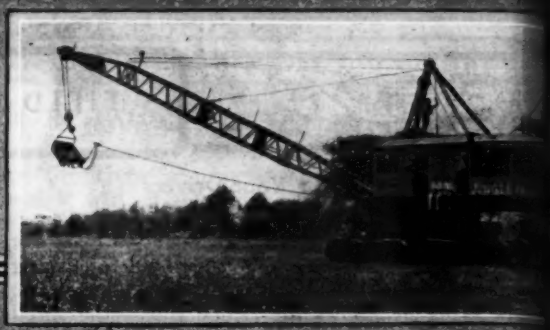
Don't forget to look at the water gauge, or to try the gauge cocks the first thing in the morning.

Don't forget to start the blow-off every morning before pulling forward the banked fire to clean out any sediment that may have accumulated in the blow-off pipe from the use of muddy water. Once a week will do if the water is good.

Don't forget to open the drip cocks before opening the throttle, and open the throttle slowly to give the cylinder time to warm up gradually and discharge water.



Bucyrus 20-B Steam Dragline Belonging to the Reconstruction Bureau, Tokyo, Japan.



Bucyrus Class-14 dragline crossing the desert, Sutlej Valley Irrigation Project, India. This machine has been named "Jungle Ka Jahaj," which means "Ship of the Jungle."

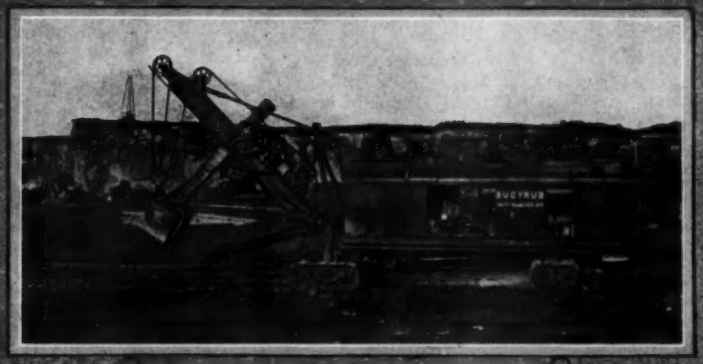
Excavation Operations in far Corners of the Earth

S. Pearson & Sons' 175-B dragline working on the Gazera Irrigation Project in the Sudan, Egypt. This company operates seven other Bucyrus draglines.

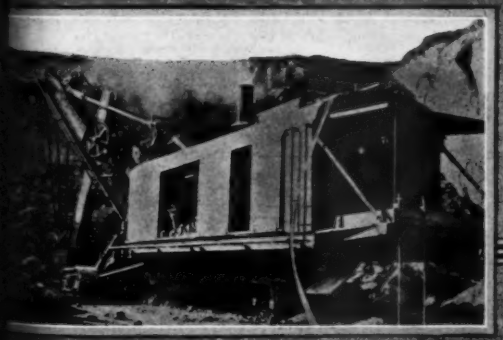
UMI

General view of the Union De Miniere du Haut Katanga's Kambove Mine in the Belgian Congo. At left, one of this company's ten Bucyrus railroad-type shovels digging iron ore.

Bucyrus Class-14 Dragline Stripping a Nitrate Deposit in Chile for the Aguas Blancus Co.



Railroad-Type Shovel on Caterpillars at Minnamurra, N. S. W., Australia, Backing Away from the Face for Protection During the Firing of a Shot.



Bucyrus 78-C, Caterpillar-Mounted Railroad-Type Shovel, Working in a Quarry for the New South Wales Ass'd. Blue Metal Quarries, Ltd., at Minnamurra, N. S. W., Australia.

Some of the Larger Rocks Handled by This Shovel

UMI

SHOTS FROM THE · FIRING LINE ·

Detroit News

BY J. J. GAULT

The Central Contracting & Engineering Co. of Detroit are operating their Class-14 and 30-B Bucyrus draglines on a sewer job, located on the 6-Mile Road, City of Detroit. This work consists of 5000 feet of laterals 20 inches in diameter, and being laid at an approximate depth of 14 feet. Digging conditions are very difficult, but very satisfactory progress is being made.

The Wabash Portland Cement Co., Detroit, Michigan, Mr. L. L. Stone, Chief Engineer, advises that they are making rapid progress with their new plant at Osborn, Ohio, and expect to start in their new quarry within 30 days. They have purchased a Marion 62 on caterpillars for their quarry and a Marion 32 for stripping overburden.

Illinois News

BY F. C. MESSENGER

Emil Koehl is operating a Bucyrus 95-C for the Lehigh Portland Cement Company at Oglesby, Illinois. John Peterland is doing the firing; J. P. Lauer is pulling the levers on the 45-C and H. A. Keith is furnishing the steam.

Frank Henry is operating an Erie for Cope & Fisher on their Springfield waterworks job in Springfield, Ill.

Iowa and Missouri

BY W. G. PARROTTE

Cameron Joyce Construction Co. are double shifting their Bucyrus 50-B on the Illinois Central Cut-off.

Columbia Quarry Co. expect to have their new plant at Columbia ready to operate in the next thirty days.

Winston Bros. were awarded contract for 30 miles of Missouri Pacific double track between Jefferson City and St. Louis. Subcontracts will be let later for the whole distance.

List Construction Co. have finished their work on the new Missouri Pacific yards in Kansas City. They will move their Bucyrus 50-B to another job.

Carmichael-Cryder Construction Co. are well under way with their contract for the new Wabash yards in Kansas City. They are operating a 50-B and a 20-B Bucyrus on this job.

The B. E. L. Coal Co. of Pittsburgh, Kansas, have opened up a new strip mine near Benaugh, Missouri. They have a new Bucyrus 50-B on this work. Warren Little, a member of the firm, will handle the levers.

F. L. Busche of Omaha has his Bucyrus 20-B gas shovel busy tearing up 19th Street Boulevard, which consists of asphalt and concrete base. This machine has been operating from 10 to 12 hours a day, 7 days a week, since the first of the year, and has only had 2 hours delay for minor repairs.

Woods Bros. Construction Co., Lincoln, Nebraska, have a Bucyrus 103-C outfit idle that they would like to put to work.

W. C. Hill was awarded contract to slush 180,000 yards of dirt into the Missouri River at Kansas City. He expects to have his pumps installed ready to start in the next two weeks.

Pacific Coast News

BY P. H. BIRCKHEAD AND J. H. SACKETT, SAN FRANCISCO

Jim Moynihan, veteran shovel engineer, with Bates & Borland, is back in Oakland after quite a stay in Southern California on a Bucyrus 18-B, and is now operating Bates & Borland's new Bucyrus 20-B shovel in Oakland.

Contract was awarded to W. H. Hauser, 3129 East 7th Street, Oakland, who bid $14,500 for the grading of 13,631 lineal feet of highway for the completion of the Mt. Tamalpais Ridge Crest Boulevard from the end of the present grade to Mt. Tamalpais Tavern.

The Montague Irrigation District, Montague, Siskiyou County, has been formed and will shortly set a date for holding bond election to vote on issuing bonds in amount of about $2,000,000 for construction of works as follows: Storage Dam — earth and rock fill type, 77 feet high and 200 feet long, total estimated cost including land $757,000; Distributing System — 48 miles main canal, also laterals, structures, bridges, etc., total cost $656,000. Dr. G. W. Dwinnell, Montague, is one of the district directors.

Plans made by State Highway Department, Carson City, Nevada, for the construction of the following projects: Churchill County — 5.03 miles of gravel surfacing from Grimes Ranch toward Fallon; Lander County — 9.94 miles gravel surface from 10 miles east of Battle Mountain to East county line; Lander County — 10 miles gravel surface from Battle Mountain to 10 miles east; Washoe County — 2.60 miles grading from Sparks to Vista; Elko County — 10 miles gravel surface from Wells to Moor; Lincoln County — 15.5 miles gravel surface from Dutch John's to north county line; Humboldt County — .84 miles gravel surface from Hurst Street to east city limits of Winnemucca; Washoe County — .7 mile gravel surface from Wadsworth to .75 mile east; Lyon County — 4.60 miles gravel surface from 9½ miles east of Yerington to county line. Plans are being prepared by Nevada State Highway Commission, Carson City, Nevada, for the following projects: Washoe County — 16 miles grading from Hafed to Derby; White Pine County — 7 miles gravel surface from Connors Pass to south county line; Elko County — 4 miles gravel surface from railroad grade separation near Silver Zone. George W. Borden is state highway engineer of Nevada.

Pittsburgh and Vicinity

BY F. B. SMITH

McCrady Bros. 30-B Bucyrus is moving an ore pile for the American Steel and Wire Co. at Pittsburgh.

W. H. Warner's Bucyrus 320-B and 50-B are well under way on their stripping property at Toronto, Ohio. They are furnishing coal to the power plant.

Johnson, Drake and Piper received a road contract in Indiana County, Pennsylvania, last week. This makes well over a million dollars' worth of road work they have in this state.

Westmoreland Lime Stone Company of Pittsburgh have purchased a Bucyrus 30-B Diesel shovel. This makes two Diesel machines they now have in their quarries.

John F. Casey's 50-B Bucyrus is starting into their big cut on the Pennsylvania Cut-off job in Ohio. Mr. Walter Walsh is in charge of this work.

Bob Cunningham has his two 20-B Diesels working on a road job in Washington County, Pennsylvania.

Chas. Flynn of the Tice-Flynn Coal Co. advised they were loading nice tonnage every month with their Bucyrus 30-B and 80-B.

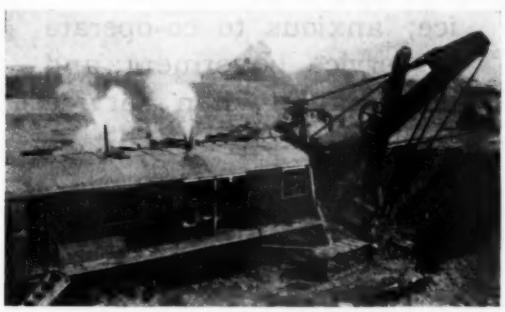
Pennsylvania Anthracite Region Activities

BY T. H. BARRETT

Mr. Chas. Strouse of Rhoads Contracting Co. has recently obtained a stripping contract from the Lehigh Valley Coal Co. near Ashland, Pennsylvania, and has contracted with the Philadelphia and Reading C. & I. Co. for the continuation of their present strippings at Locust Gap. Mr. Strouse contemplates installing an electric shovel on the last-named job.

A Bucyrus 70-C owned by A. E. Dick loading large rock for L. & W. B. Coal Co. Note steam from second machine at right.

A. E. Dick is working the Honey Brook strippings for the L. & W. B. Coal Co., and is digging coal for the Lehigh Valley Coal Co. and C. M. Dodson at Spring Mountain and Beaver Brook respectively.



One of A. E. Dick's caterpillar-mounted railroad shovels working on Honey Brook Stripping No. 1 of the L. & W. B. Coal Co.

The Central Pennsylvania Quarry Stripping and Construction Company have purchased dragline equipment for their Bucyrus 50-B shovel for use in diverting a creek away from their stripping operations at Stockton. The work is being done for the Lehigh Valley Coal Company.

Dick Construction Co. are operating at the Upper Lehigh stripping for the Hazle Brook Coal Company and at Packer No. 4 and Spring Mountain for the Lehigh Valley Coal Co. They have recently been awarded a stripping contract at Spring Brook by the same company and have ordered new dump cars. They also have a small job at Tomhicken.

Mr. J. Robert Bazley, well-known contractor of Pottsville, is active on the Crystal Ridge stripping of the Cranberry Creek Coal Co. The 320-B electric shovel is

Loading some big ones with a Bucyrus 320-B electric, J. Robert Bazley, contractor, at Cranberry Creek Coal Company. Note drills on bank to right.

successfully handling large boulders. Mr. Bazley is also operating at Natalie for the Colonial Colliery Co. and at Bast for the Philadelphia and Reading.

Southern States News

BY W. W. WHORLEY

L. F. Anding is operating a Bucyrus 20-B at Ethel, Louisiana, for Calmes & Hague of Baton Rouge, La.

H. P. Bruce is stripping coal with a Bucyrus 175-B at Carbon Hill, Alabama.

Cut your Haulage Costs with KOPPEL CARS
Poor cars are only an added burden to any plant — repair and lubricating costs —loss of time—can be avoided by specifying Koppel Cars and Track equipment.
Write today for our latest bulletins or tell us your problem and let us advise you.
Our Sales Offices in New York, Pittsburgh, Chicago and San Francisco are at your disposal.
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John Fenton is cutting off a corner of Signal Mountain with a Bucyrus 50-B at the plant of the Signal Mountain Portland Cement Company. J. W. Parks is keeping things hot.

Frank Payne is loading rock with a 76 for the National Portland Cement Company at Ragland, Alabama. Marion Daffron is riding the boom.

Bill Bishop has been loading gravel at Camden, Tennessee, with a Bucyrus Panama shovel.

The Dempster Construction Company of Knoxville, Tennessee, are making the dirt fly on their reservoir contract for the City of Asheville.

St. Louis Items

BY A. B. KOENIG

Pete Shugart bought a carload of mules from Cameron, Joyce & Co. that he shipped to his Illinois Central work. Cameron, Joyce & Co. are going to get rid of their team outfits as fast as possible and in future confine their contracting to paving and steam shovel work. While in the country the other day Shugart spied a saddle horse that he thought would suit his daughter. Pete, of course, bought it and surprised the young lady at Nevada, Iowa.

J. W. Peed and Young Tom Blythe, Jr., were with us for a day. Peed reports a shovel and three machine outfits busy on the Illinois Central Cut-off in Illinois. He bought several miles of new steel while here.

S. J. Groves & Sons Co. have started on their state highway work out of Sweet Springs, Missouri. This is only one of several splendid road jobs that they are working on in Missouri.

Albert Hood has one team outfit at work on state highway in Platte County, Missouri. He is also busy with another one near Savannah, Missouri.

Sharp & Fellows are low bidders on 65 miles of new Santa Fe Railroad in Texas.

R. T. Amis moved his outfit from Oklahoma on to the new Kansas City Waterworks grading.

The Union Bridge Co. were awarded contract for substructure of the Santa Fe bridge across the Mississippi River at Fort Madison, Iowa.

W. A. Ross Construction Co. has started grading on Road No. 2 out of Concordia, Missouri.

Cook & Stucker are making good progress on their state highway paving job between Kansas City, Kansas, and Overland Park, Kansas.

Carmichael-Cryder Co. started moving dirt on their Wabash yard job in North Kansas City, Missouri.

Sprague & Nicely were awarded 63 miles of new Santa Fe work out of Kiowa, Kansas.

Frank Smith has moved his outfit on to a state highway job near Perry, Missouri.

S. E. Gould is making nice progress on the Industrial Track Construction Co. work on the new Wabash yards in North Kansas City.

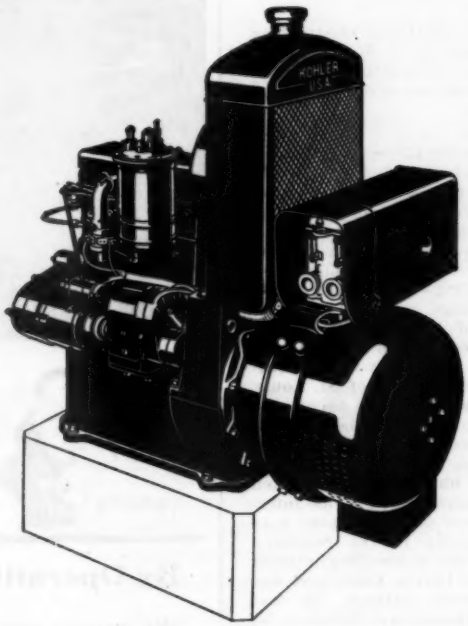
SERVICE

We carry large stocks of special materials, repair parts, and even finished boilers for quick deliveries. Customers find us willing and able to give them service; anxious to co-operate in service betterment; and dependable when service really counts.

JOHNSTON BROS., Inc.

Specializing in Boilers for Contractors' Equipment

FERRYSBURG, MICHIGAN



Kohler Automatic Model "D"

Lighting the Job with Your Own Electricity

Electric lights speed up a job, save labor and time, and add greatly to the efficiency and comfort of men and animals.

Contractors in every line of outdoor work — dredging, excavating, road-building, lumbering—have found the Kohler Automatic remarkably successful for their requirements.

This plant eliminates storage battery care, expense and bulk. All it needs is a small starting battery to provide automatic start and stop. It produces current of the 110-volt kind, allowing for the use of standard lamps and appliances. Lights are bright and steady — upkeep and operating costs low. The plant is dependable and good for years of service.

Our 48-page booklet "The Principle and the Proof" tells more about this unusual plant and of the successful experiences of others in every field.

Write for this booklet.

KOHLER OF KOHLER

Founded 1873

Kohler Co. Kohler, Wis.

Walter Le Master reports 12 teams, wheeler and fresno outfit idle.

Roger P. Faubion of the J. W. McMurry Contracting Co. sold his interest in this company to J. W. McMurry, and is going to retire from the contracting business. Roger says he has made his and is going to quit and take it easy in the future.

Edward J. Scott of the John Scott Railroad Contracting Co. died at noon May 7th after an illness of two months. Death was caused by a relapse after an operation for the removal of an abscess of the brain performed at St. Mary's Hospital. As head of the contracting company established by his father, John Scott, pioneer St. Louisan, and through his interests in coal mining at Duquoin, Illinois, and steel castings at Elyria, Ohio, Scott became well known not only in St. Louis but throughout this entire section of the country. Scott, who was 61 years old, spent his entire life in St. Louis. He was educated at St. Vincent's College at Cape Girardeau, Missouri, and in the business colleges of St. Louis. He became a partner of his father when he became of age, and on the death of John Scott in 1908 became the head of the company. During his association with his father and since that time contracts for large projects in the West and the Southwest have been undertaken and completed. In the past ten years Scott became interested in coal mining, and was one of the pioneer men in the development of strip mining in the Southern Illinois fields. He also acquired the controlling interest in the Columbia Steel Company of Elyria, Ohio, and was widely known as a producer of steel castings. He was married in 1892 to Miss Nellie Dougherty, daughter of Mathias Dougherty, formerly a well-known wholesale grocer of St. Louis. There were no children born of this marriage. Scott was known in the city as a lover of fine horses, and was a member of the St. Louis Riding and Hunt Club.

L. I. Viall, 3936 Euclid Avenue, Kansas City, Missouri, has a steam shovel outfit that he can place on work immediately.

E. L. House, the old-time fence builder, is still in the land of the living. We received a letter from him dated at Honey Grove, Texas, the other day, stating that he is going to bid on a fence job for the United States Government on the border line between the United States and Mexico. He asked the writer to go out to Shaw's Garden to see if the steel posts of a fence that he built over 25 years ago are still standing and in good shape. We had the satisfaction of notifying House that these posts are still in the pink of condition, fence still standing, so suppose House will be building one of the fences along the southern part of the United States. Incidentally our friend House informs us that he is only 72 years old, going strong and longing for some of the good times that Geo. Lawrence, Pete Gifford, Andy Koenig and himself had here years ago when this bunch were young and full of pep. House is making his headquarters in Room 707 T. & P. Building, Dallas, Texas.

The Midland Construction Co. of Paragould, Arkansas, has been awarded the contract for all work in the St. James Drainage District, comprising Mississippi and New Madrid Counties, in Missouri. The contract embraces work costing approximately $175,000. The job calls for two draglines, one floating dredge, 21 steel bridges, 150 concrete inlets and a conduit of 1,750 feet. Approximately 23,000 acres of fertile farm lands are embraced in the district.

Increase Your Profits

By Operating a Night Shift

We supply complete electric lighting outfits — either steam or gas driven.

Easy to install — no electrician required.

Simple to operate — no storage batteries.

SOMETHING NEW!

Special plant for lighting camps — press a button or turn on any lamp and generator starts immediately. Stops automatically when lights are turned off.

Bucyrus Company,
Specialty Department,
South Milwaukee, Wisconsin.

I am interested in a lighting plant for.....

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Name .....

Address .....

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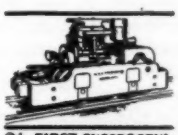
19 Years of Service

The first successful gasoline locomotive was built by Whitcomb in 1906. *Today* after 19 long years of hard service and abuse in hauling coal in the Kolb Coal Company's mines at St. Louis, Missouri, this Whitcomb is still doing its work well.

Whitcomb No. 1 is used as an auxiliary locomotive, and is called into duty when some of the other haulage equipment is laid up for repairs or when they are in need of an extra locomotive.

We feel proud of our success as manufacturers of gasoline and electric storage battery locomotives. When it comes to our attention that some of the *original* "Whitcombs" —built way back in 1906—are still carrying on, we believe we have lived up to our reputation as builders of locomotives "Designed to work—Built to overwork."

We build into our present day locomotives the same mechanical exactness, exclusive design, quality of material, and skilled workmanship we did in 1906. We will be glad to send you a catalog telling you about "Whitcombs" that last a lifetime.



Geo. D. Whitcomb Company
Rochelle - Illinois
Offices in Principal Cities

GASOLINE-STORAGE BATTERY-ELECTRIC
WHITCOMB
LOCOMOTIVES

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L. J. Buckner and E. A. Bernard will be in Winston Bros. new office located in the Buder Building, St. Louis.

H. W. Hutton, P. O. Box 541, Valparaiso, Indiana, has a 20-team outfit idle that he would like to place on work immediately.

J. W. McMurry of the J. W. McMurry Contracting Co., Kansas City, was with us a couple of times. He bid on several bridge and concrete jobs, on the Wabash and Frisco Railroads. His pencil was not sharp enough. He bid a little too high.

Harry L. Massman was awarded a couple of nice revetment and river shore protection jobs in the western part of the state.

The John T. Walbridge Engineering Co. of Chicago completed the new $300,000 waterworks plant at Litchfield, Illinois. The new reservoir is 4600 feet long and 600 feet wide, providing a water surface of 50 acres. It will hold three million gallons of water, and will supply five million gallons per day. The pumping station is complete in every detail and equipped with modern machinery throughout.

C. D. Herren is working his team outfit on a small job at Spickard, Missouri. He expects to finish this in about thirty days. Will be in the market for some more grading.

W. B. Hutchinson, 415 Guaranty Building, Indianapolis, has 100,000 yards of grading to sublet on their work south of Terre Haute, Indiana. About 40,000 yards of this is dragline work and the rest shovel work.

Roy Ross and Donald Mather of the Bates & Rogers Construction Co. are making a good start on their concrete and bridge work on the new Missouri Pacific double track work between St. Louis and Jefferson City.

J. T. Frame and W. O. Johnson of the Fairbanks-Morse Co. spent several days in this neighborhood looking over the labor situation and things in general.

M. L. Windham, Franklin Hotel, Benton, Illinois, has about 500 feet of bridge work to let.

United Construction Co., Cincinnati, are low bidders for concrete bridges on the Frisco Railroad south of St. Louis.

L. J. Sexton of the Walsh Construction Co. took a flying trip into St. Louis from Sidney, Ohio. He has nothing new to report this time.

Luther S. Oakes and W. J. Rohan of the Winston Bros. Co., Minneapolis, Minnesota, sprung a surprise on the local contractors by landing 30 miles of double tracking for the Missouri Pacific Railroad between Kirkwood and Jefferson City, Missouri. This is one of the best railroad jobs let in this part of the country so far this year.

H. R. Peterman was awarded a rip-rap and shore protection job by the Missouri Pacific Railroad in the central part of the state.

Bates & Rogers Construction Co. of Chicago were awarded contracts for all structures on the new Missouri Pacific Railroad double-track work between Kirkwood and Jefferson City, Missouri. Donald Mather will be in charge.

YOUR CHAIN IS IMPORTANT

If the chain on your steam shovel is not dependable the working efficiency of your entire equipment is reduced accordingly.

The use of Taylor Mesaba Chain on steam shovels is not an experiment; it has demonstrated its ability for such work by 52 years' actual service.

There is a reason behind the long successful performance of Taylor Mesaba Chain. That reason is—special attention to raw materials, a distinct method of piling the iron in the manufacturing process and expert workmanship.

Stock sizes for all makes of shovels: 5/8", 3/4", 7/8", 1", 1 1/8", 1 1/4", 1 3/8", 1 1/2", 1 5/8", 1 3/4".

Write for Catalog E

TAYLOR MESABA STEAM SHOVEL CHAIN

S. G. Taylor Chain Company

Established 1873

641 Marquette Building Chicago, Illinois

Most Contractors Use WESTERNS

Western 12-yard Dump Cars in Atlantic Seaboard Railroad Construction in Florida.

If you never have used WESTERNS work a few along with your others and note the difference.

Western

That's Why

Of the eight grading contracts in connection with the new Edgewood-Fulton Illinois Central Cut-Off, WESTERN Dump Cars have been installed on seven. The installation of WESTERN Dump Cars on the new Pennsylvania's Canton-Bayard Cut-Off is almost 100 per cent.

This is typical of the predominance of WESTERN Dump Cars on every large construction job. Contractors know that to get the most out of their steam shovels they must have dependable dump cars that will stand grief. And most of them will indorse the course of the Arizona steam shovel superintendent who installed WESTERN Dump Cars,

"because they will stand more grief than any other dump cars built."

Send for Catalog B-61 today.

Western Wheeled Scraper Co.

Founded 1877

Earth and Stone Handling Equipment

Aurora, Illinois

For convenience in making inquiry use postal inserted in this number.

The following contractors have subbed work and placed outfits on Winston Bros. new Missouri Pacific railroad double-track work between Kirkwood and Jefferson City, Missouri: Winston Hill Co., Bates & Rogers Co., Hancock & Tate, Geo. W. Swafford, Keating Bros., Paddy McGraw, T. E. Newell, Dan Condon, Allhands & Davis, List & Bagwell, J. Spencer and Mr. Ballard.

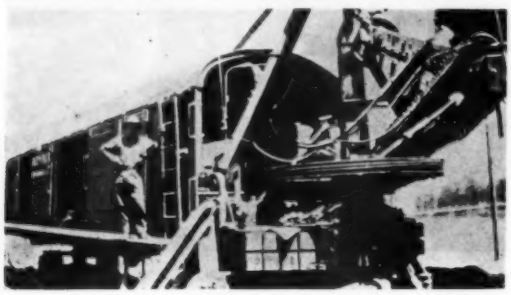
Contractors when in want of work or labor for their outfits write, wire or phone the old reliable Koenig Labor Agencies, 612 Walnut Street, St. Louis, Missouri, or 501 Delaware Street, Kansas City, Missouri.

Utah

The South Plains & Santa Fe Railroad has been granted authority by the Interstate Commerce Commission to construct 65 miles of new railway in Texas, from Dowd west to the west line of Cochrane County.

Australia

This illustration shows W. J. Atkins, operator of a Bucyrus 103-C electric railroad-type shovel, operating at the plant of the Kandos Cement Company at Kandos,



Sydney, New South Wales, Australia. W. J. Atkins writes that they are all very well pleased with the machine.

Canada

Montreal and Vicinity

BY J. M. WARD

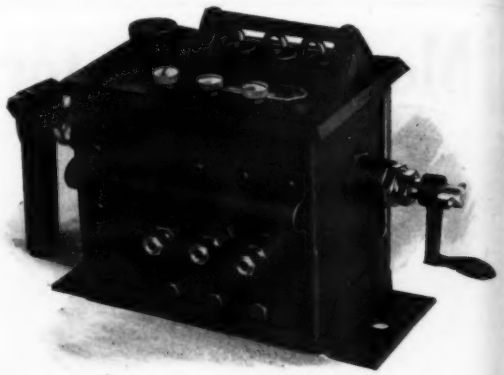
The new loan of the Montreal Water Board amounting to $6,000,000 has been approved. It is expected that tenders will be called very quickly now for this work, which will consist amongst other things of a canal, pump house, etc.

We have had visits from several contractors from the Lake St. John District within the past week. Amongst others we may mention Tom Gorman of Gorman & Peckham, Thos. Cozzolino and Dominique Desantis.

G. L. Campbell and Hamilton Lindsay are constructing a new concrete dock for the Montreal Dry Dock Company. They have been working at this now for a couple of months and expect to be through about August.

Cavicchi & Cooke have been awarded the contract for sewers and streets at Corner Brook, Newfoundland, and have started operations there.

There are no new developments in connection with the proposed power development at Grand Falls, New Brunswick. The International Waterways Commission is to meet in Montreal during May to endeavor to arrive at a decision regarding the rights which the New Brunswick Government are asking for in Maine waters.



Madison-Kipp Lubricators come in Blind and Sight Feed Types. Blind Feed up to four feeds. Sight Feed — any number of feeds.

Do You Want Some Inside Information?

ENGINE operators are usually very curious as to how, why and what makes the wheels, levers or parts of a piece of mechanism do what they do. With a long standing success in standard devices like Madison-Kipp lubricators, however, it is often true that they are merely accepted as superior upon their reputation. Many times we find operators and engineers who have used our lubricators for years without any knowledge of their working principle or parts.

There is an interesting story connected with the design and working parts of Madison-Kipp lubricators. We believe any operator or engine mechanic would find this story instructive as well as interesting.

We have prepared a bulletin which describes the inside mechanism of Madison-Kipp lubricators which we will send to anyone requesting it.

May we mail one to you? Ask for Bulletin No. 50.

Madison-Kipp Corporation

Madison, Wisconsin, U.S.A.

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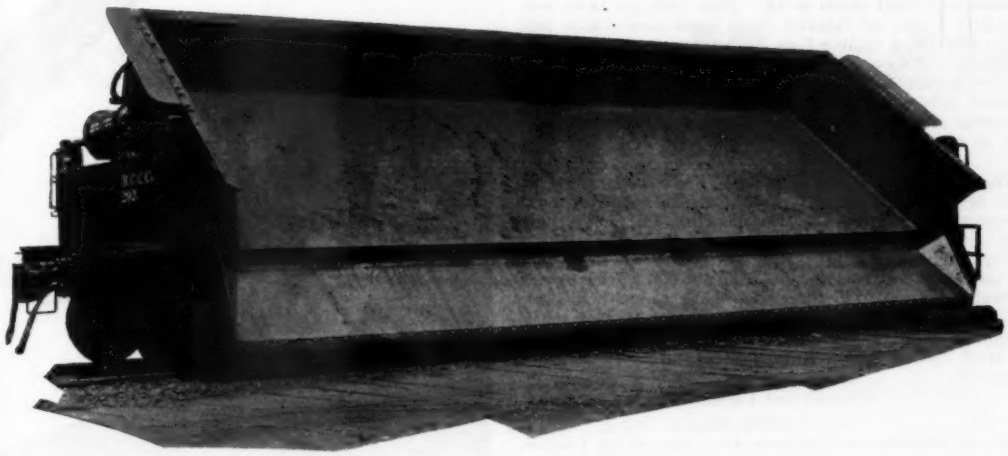

Large Capacity Dump Cars Decrease Handling Costs

Extension Side Dump Cars have a level full capacity of 30 cubic yards—43 cubic yards normal heaped load.

Because of its large capacity, the Extension Side Dump Car is decidedly a sound and profitable investment from the standpoints of initial cost, operation and maintenance.

This size car has many advantages over smaller capacity cars; the cost per cubic yard of car capacity is less, fewer cars are required for a given amount of work, and the handling and maintenance expense per cubic yard of material moved is lower.

Its large capacity makes it particularly adaptable in general construction work. Any material that can be placed in the car by modern loading equipment can instantly be discharged over the down-turning door.

More than 90 companies use our 30-yard Extension Side Dump Cars.

Full Descriptive Matter on Request.

CLARK CAR COMPANY

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PITTSBURGH, PA.

NEW YORK OFFICE: 52 Vanderbilt Ave.
SAN FRANCISCO OFFICE: Rialto Building
CHICAGO OFFICE: 122 South Michigan Ave.

For convenience in making inquiry use postal inserted in this number.

The Singer Mfg. Co. are going to erect a new mill to handle all their wood work. They will get their supplies over a line of railway from their own limits, and will construct a railroad to be known as the "Thurso and Nation River Railway." This line will be about 25 miles long, and contracts for the construction were awarded this week. Messrs. Cavicchi & Cooke were the successful tenderers and are making arrangements to start at once.

The Quebec Streams Commission are making a big fill up at Hebertville, which is on the western end of Lake Kenogami. Fraser-Brace Engineering Co. have been using dredges and sand pumps, and while they were tied up during the winter, they started to work in April and took out between 400,000 and 500,000 yards by the hydraulic method. On this same work Gorman & Peckham are using a Model 60 and a Model 20 Marion working double shift. They put out about 150,000 yards during April. They expect to be finished in another couple of months.

Toronto and Vicinity

BY C. F. ENGLAND

Boss & Brazier Construction Co., Limited, of London, Ontario, have secured a contract from the Ontario Department of Public Highways for approximately nine miles of concrete highway on the London-Chatham Road.

The Corbett Construction Company, Limited, of Humberstone, Ontario, have started their new 175-B Bucyrus electric dragline on Section 7 of the New Welland Ship Canal.

Orr & Clarke, contractors of Toronto, were successful in securing a nine-mile concrete road job from the Ontario Department of Public Highways at a recent letting. This job covers the Cobourg to Grafton Section of the London-Chatham Highway.

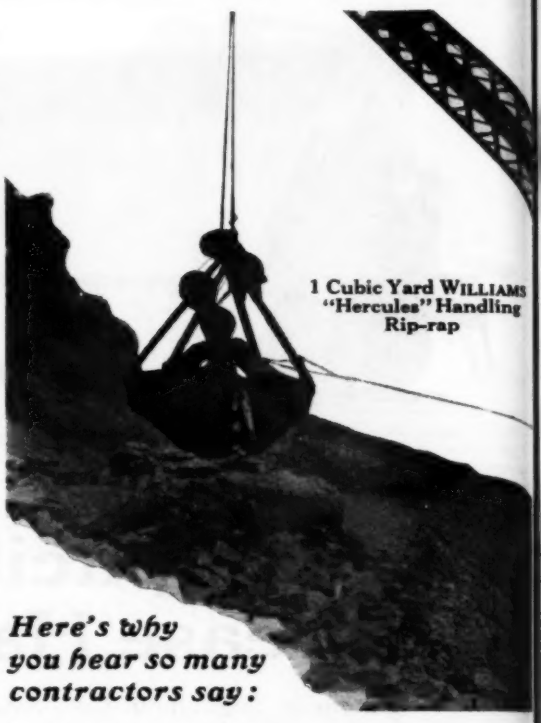
Among the successful contractors securing concrete road work from the Ontario Department of Public Highways we might mention the following: King & Holmes, Oakville, Ontario; W. H. Harvey & Sons, Deseronto, Ontario; W. A. Stewart, Preston, Ontario; Paul Bergmann, Waterloo, Ontario (two contracts); Curran & Briggs, Toronto, Ontario; L. S. Lichty Bros., Wellesley, Ontario; Bate-McMahon, Ottawa, Ontario; Grant Bros., Ottawa, Ontario; The Paving & Mastic Co., Limited, Toronto, Ontario.

We were glad to meet Mr. John Pirson, contractor, of Stephensville, Ontario, on the street the other day. Mr. Pirson has just returned from Florida and is starting in on his work for Welland County.

Black Gum Rollers

Standard dragline sound heart black gum rollers recommended by all contractors as superior to maple, at one-third the cost. Send us a trial order for a set, and be convinced. Used exclusively in all southern levee building on soft soil, which is a hard test on rollers. They have proven superior to all other materials.

Doherty-Walsh Roller Co.
Baton Rouge, Louisiana



1 Cubic Yard WILLIAMS "Hercules" Handling Rip-rap

Here's why you hear so many contractors say:

"the best bucket we have ever used is the WILLIAMS"

Here's the bucket that combines — in greater degree than any other bucket ever made — the three qualities that a bucket needs:

(1) **Digging power** for biting right into hardpan, cemented gravel, etc. The WILLIAMS tandem-sheave power arm combines the block-and-tackle and lever in the one way that gives a *straight line closing pull.*

(2) **Speed on every job** — handling materials or excavating. Has more power for a faster bite — and has a shorter cable overhaul.

(3) **Durability.** Simple and rugged construction — no counterweights — all the weight is built right into the bucket. Every WILLIAMS Bucket has *all parts guaranteed against breakage, as long as the bucket is used on the classes of work for which we recommend it.*

Write for details—

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Eastern Sales Office: 30 Church Street, New York City

WILLIAMS
FAST-DIGGING BUCKETS
All Parts Guaranteed Against Breakage

How Will You Handle That Fast Job?

WHEN you put on two or three shifts a day, you do the job with one-half or one-third as much equipment as you'd use on a one-shift-a-day basis. For the bonus jobs, doubling up on time pays well, too.

Dependable lighting, ample light for every unit and every operation, lights that won't fail, are furnished for those jobs by Pyle-National steam turbo-generators and Pyle-O-Lytes, the better floodlights. They are quickly and easily installed on any machine.

The relation of good floodlighting to your profits is quickly explained by Catalog 4. Or do you want to talk to a thoroughly experienced man who knows floodlighting and knows what it can do for you? Say which and we'll send either one.

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Export Department: International Railway Supply Company, 30 Church Street, New York City

EE-6F-RTG

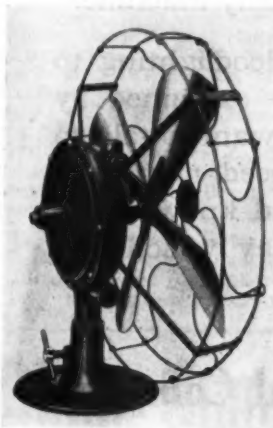
TRADE NOTES

The *Sullivan Machinery Company* announces the appointment of the K. B. Noble Company as exclusive representative to handle Sullivan ball and stationary air compressors, hammer drills, etc., in the state of Connecticut and Massachusetts, including Worcester County. Messrs. Noble & Company will maintain a complete stock at their warehouse at Hartford.

The Diamond Power Specialty Corporation of Detroit, Michigan, manufacturers of Diamond Soot Blowers for Water Tube and Horizontal Return Tubular Boilers, have appointed the Midwest Machinery Company, 104-106 South Main Street, St. Louis, Missouri, as their representative for the territory of Missouri, adjacent to St. Louis, south of and including Springfield and Decatur, Illinois.

The *La Plant-Choate Mfg. Co.* of Cedar Rapids, Iowa, have recently placed on the market a new hydraulic self-loading 2-wheel scraper of 1¼-cubic-yards capacity. The wheels are equipped with roller bearings arranged for Alemite lubrication. The steel castings are close; gray iron is used in the construction. A hydraulic jack raises the scraper. The manufacturer claims that a train of three scrapers may be operated by one tractor runner and a scraper man.

The *Lansing Company of Lansing, Michigan*, have recently placed on the market a new improved Lansing No. 7-S concrete mixer, with which an 80-foot per minute, 750-pound capacity hoist can be furnished. For further information write the manufacturer.



This Steam-Driven Fan

Mounted on your shovel or dragline will make hot days cooler for your operator, will drive away flies, mosquitoes, etc. This will mean greater comfort, greater yardage, and in the end—GREATER PROFITS.

A ¼" pipe supplies all the steam required.

Specialty Department

BUCYRUS COMPANY

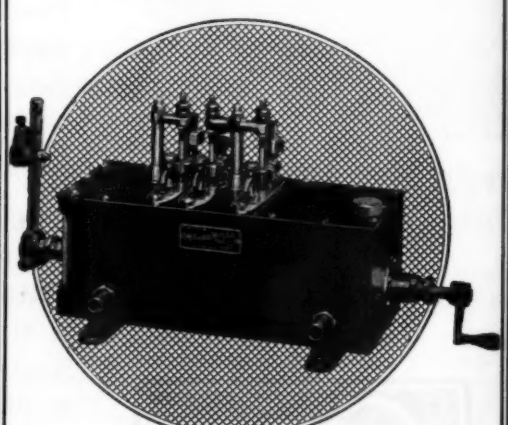
SOUTH MILWAUKEE, WIS., U. S. A.

A McCord Force Feed Lubricator Will Keep Your Shovel on the Job

A McCord force feed lubricator installed on your steam shovel now will insure more continuous operation. Dependable force feed lubrication prevents shutdowns and delays, it gives more hours on the job.

McCord force feed lubricators are used as standard equipment by the largest and best-known steam shovel builders and they will be installed on any shovel at your request.

Put a McCord lubricator on now and be assured of dependable lubrication for the life of your shovel.



McCord Class B. A. Force Feed Lubricator

McCord Radiator & Mfg. Co.

Detroit, Michigan

McCord *force feed* **Lubricators**

OMETHING THAT MAY SAVE YOU MONEY

We have not always been the trail-blazers in introducing new explosives or in improving explosives of established types. Often, however, we have been esponsible for innovations that have been valuable to users f explosives.

We were privileged, a short time ago, to announce *Hercolasting*—a new method consisting of column-loading black owder in well-drill holes and firing the charges with Coreau. It is applicable in many quarries and other operations here the column-loading of dynamite has been found economical. The effectiveness gained by this method in columnoading is, of course, not obtained in pocket-loading.

We have no faith in cure-alls or blanket recommendations; o we cannot advise you to adopt Hercoblasting without nowing your particular problems. But others have been ble to effect a saving of from 20 to 40 percent by using Herco Blasting Powder in Hercoblasting, and, if you feel that e might help you by giving you the benefit of our experince with this new powder and new method, we shall be lad to do so.

The following publications will be sent free, upon request: Scientific Quarry Blasting, Hercoblasting, Modern Road Building, Safety in the Use of Explosives, Eliminating Waste in Blasting, Shot Firing by Electricity, Hercules Galvanometers & Rheostats, Dynamite: the New Aladdin's Lamp, Conquering the Earth. Address, Hercules Powder Co., 990 King St., Wilmington, Del.

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HERCULES POWDER CO.

UMI

Bucyrus 20-B air-operated shovels excavating for Philadelphia's new Broad Street Subway on Patrick McGovern's contract. Six of these shovels are in use on this work. Both of these views were taken on the first cut through, about 50 feet in width, and give an excellent conception of the favorable working condition and the character of the material to be excavated. These shovels load trucks in the subway which get to the street level by means of ramps.